

CLAIMS

- 5 1. A data scrambler, for use in a multi-carrier transmission system in which synchronisation frame data is periodically transmitted from a transmitter to a receiver to measure transmission channel characteristics, characterised in that combiner means are provided to combine user data with frame synchronisation data.
2. A data scrambler, as claimed in claim 1, characterised in that said combiner means has a XOR function.
- 10 3. A data scrambler, as claimed in either claim 1, or claim 2, characterised in that said frame synchronisation data is pseudo random.
4. A data scrambler, as claimed in ^{claim 1} ~~any previous claim~~, characterised in that said combiner means is adapted to combine said user data with the two most significant bits of a synchronisation frame.
- 15 5. A data descrambler, for use in a multi-carrier transmission system in which synchronisation frame data is periodically transmitted from a transmitter to a receiver to measure transmission channel characteristics, and transmitted data is scrambled using a data scrambler as claimed in ^{claim 1} ~~any of claims 1 to 4~~, characterised in that combiner means are provided to combine received data with frame synchronisation data.
- 20 6. A data descrambler, as claimed in claim 5, characterised in that said combiner means has a XOR function.
7. A data descrambler, as claimed in either claim 5, or claim 6, characterised in that said frame synchronisation data is pseudo random.
- 25 8. A data descrambler, as claimed in ^{claim 5} ~~any of claims 5 to 7~~, characterised in that said combiner means is adapted to combine said received data with the two

most significant bits of a synchronisation frame.

5 9. A multi-carrier transmission system in which synchronisation frame data is periodically transmitted from a transmitter to a receiver to measure transmission channel characteristics, characterised in that said transmission system incorporates a data scrambler as claimed in ^{claim 1} ~~any of claims 1 to 4~~, connected to said transmitter.

10 10. A multi-carrier transmission system, as claimed in claim 9, characterised in that said receiver is connected to a data descrambler as claimed in ^{claim 5} ~~any of claims 5 to 8~~.

10 11. A multi-carrier transmission system, as claimed in claim 10, characterised in that said multi-carrier transmission system employs DMT.

12. A multi-carrier transmission system, as claimed in claim 10, characterised in that said multi-carrier transmission system employs OFDM.

15 13. A multi-carrier transmission system, as claimed in ^{claim 10} ~~any of claims 10 to 12~~, characterised in that means are provided for transmitting frame synchronisation data from said data scrambler to said data descrambler.

20 14. In a multi-carrier transmission system in which synchronisation frame data is periodically transmitted from a transmitter to a receiver to measure transmission channel characteristics, a method of scrambling user data prior to transmission, characterised by combining user data with frame synchronisation data.

15. A method, as claimed in claim 14, characterised by combining user data with frame synchronisation data by mean of an XOR function.

16. A method, as claimed in either claim 14, or claim 15, characterised by said frame synchronisation data being pseudo random.

25 17. A method, as claimed in ^{claim 14} ~~any of claims 14 to 16~~, characterised by combining

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said user data with the two most significant bits of a synchronisation frame.

18. In a multi-carrier transmission system in which synchronisation frame data is periodically transmitted from a transmitter to a receiver to measure transmission channel characteristics, a method of descrambling received data which has been scrambled by the method claimed in ^{claim 14} ~~any of claims 14 to 17~~, characterised by combining received data with frame synchronisation data.

19. A method, as claimed in claim 18, characterised by combining received data with frame synchronisation data using an XOR function.

20. A method, as claimed in ~~either claim 18, or claim 19~~, characterised by said frame synchronisation data being pseudo random.

21. A method, as claimed in ^{claim 18} ~~any of claims 18 to 20~~, characterised by combining said received data with the two most significant bits of a synchronisation frame.

22. A method, as claimed in ^{claim 14} ~~any of claims 14 to 21~~, characterised by said multi-carrier transmission system employing DMT.

23. A method, as claimed in ^{claim 14} ~~any of claims 14 to 21~~, characterised by said multi-carrier transmission system employing OFDM.